

FULL CIRCLE RELEASING SPEARS

Instruction Manual 2100



Full Circle Releasing Spears

Full Circle Releasing Spears

INDEX

Full Circle Releasing Spears	
General Description	3
Use	3
Construction	3
Operation	4
To Engage and Pull the Fish	4
To Release from the Fish	4
Operation with Accessories	5
Precautions	5
Explanation of Mechanism	5
Function of Spear During Engaging Operations	5
Function of Spear During Releasing Operations	6
Explanation of Safety Rings and	
Safety Ring Packoffs	6
Maintenance	6
Accessories	7
Specifications and Replacement Parts	8 – 12
Range Sheets	13 – 14
Strength Chart	15

The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. National Oilwell Varco, whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.

Sixteenth Printing, September 2005

General Description

The **Bowen Full Circle Releasing Spear** is a patented fishing spear designed to assure positive internal engagement over a long section of a fish. The design of the Full Circle Slips and the effect of the tapers of the Body upon the Slips cause the expansion strain to be distributed evenly over a long vertical section and virtually over the entire inner circumference of a fish, permitting tremendous pulling and jarring strains with no danger of distorting the fish.

Use

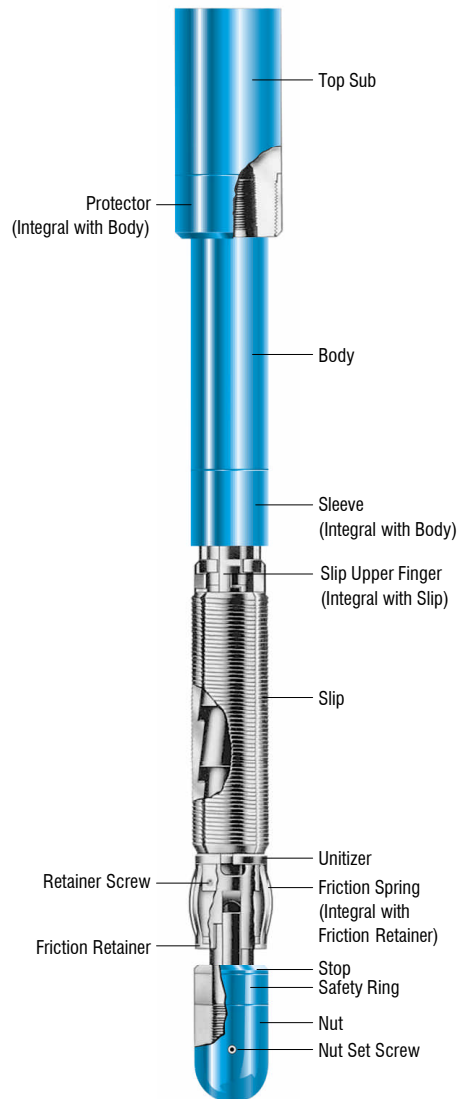
The Bowen Full Circle Releasing Spear is used to internally engage and retrieve all sizes of tubing, drill pipe and casing. It may be used in conjunction with internal cutters to perform cut and pull operations, if desired.

Construction

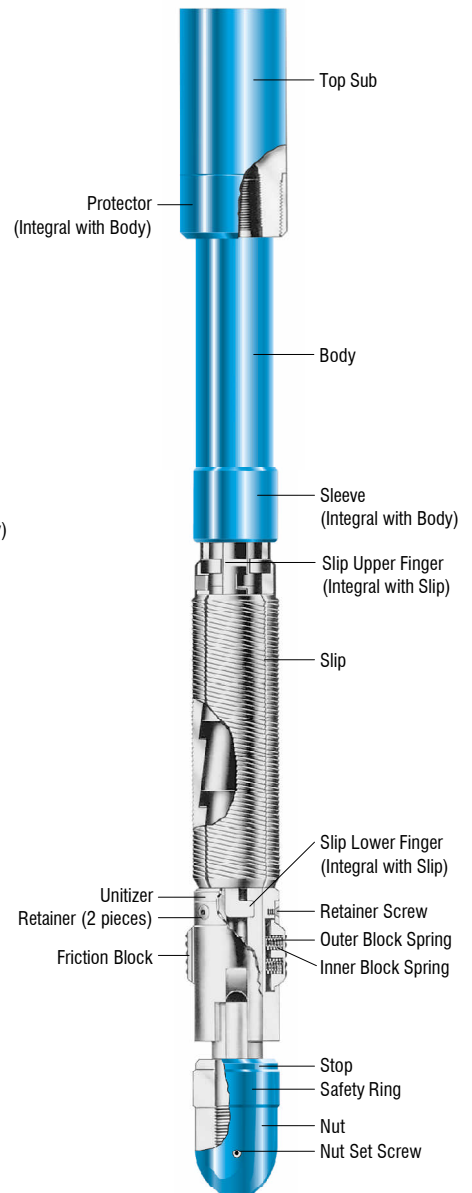
Construction of the Bowen Full Circle Releasing Spear varies slightly with size. The tubing and drill pipe size Spear for all tubing and drill pipe through 3 $\frac{1}{2}$ " nominal, 4" O.D. tubing, use a Friction Spring Assembly for a friction grip mechanism. All tubing and drill pipe size Spears above 3 $\frac{1}{2}$ " nominal tubing and all Casing Size Full Circle Spears use Friction Block assemblies for a friction grip mechanism.

All Full Circle Spears for tubing and drill pipe are composed of a Top Sub, Protector (when a Skirt and Guide are not used), Body, Slips, Friction Spring Assembly or Friction Block Assembly, Stop, Safety Ring, Nut, and Nut Set Screw.

The Friction Block assembly includes a Unitizer, Retainer (2 pieces), Friction Blocks, Retainer Screws, Outer Block Springs, and Inner Block Springs.



**Bowen Full Circle Releasing Spear
with Friction Springs
for 2 $\frac{3}{8}$ " thru 3 $\frac{1}{2}$ " Tubing**



**Bowen Full Circle Releasing Spear
with Wiper Blocks
for 4" DP thru 5 $\frac{9}{16}$ " DP**

The Friction Spring Assembly includes a Unitizer, a Friction Retainer, Friction Springs (which are integral with the Friction Retainer), and Friction Retainer Screws.

The Top Sub of Full Circle Spears for tubing or drill pipe serves as a stop and is provided at its lower end with a suitable thread on which is assembled either a Skirt and guide when these are used, or a thread protector when they are not.

The Body has a series of large tapers on its outside diameter which match similar tapers on the inside diameters of the Slips. The purpose of these tapers is to cause the Slips to expand and contact the fish, during operation. The Body has lugs near the upper end, which maintain the upper ends of the Slips in position. The lower ends of the Slips are maintained in position by the Unitizer, which is fitted around the Body near its lower end. The Unitizer is kept in position by the Stop, Safety Ring (or Safety Ring Packoff), and Nut at the lower end of the Body.

The Retainer holds the Friction Blocks on all assemblies for 3¹/₂" nominal tubing and above, including all casing sizes. Friction Retainers for 3¹/₂" tubing and smaller have integral Friction Springs.

The Full Circle Slips (3 or more depending on size of the spear) are designed to permit easy entry into or withdrawal from the fish. When retracted, the Slips form almost a completely full diameter. As a result of this design, the Full Circle Slips present from 30% to 450% more slip engagement than most other spears on the market. This reduces the tendency to distort or rupture the fish to an absolute minimum.

The purpose of the Safety Ring is to prevent the spear from entering any fish whose inside diameter is too small to allow entrance of the retracted Slips.

The Nut guides the Spear into the fish.

Operation

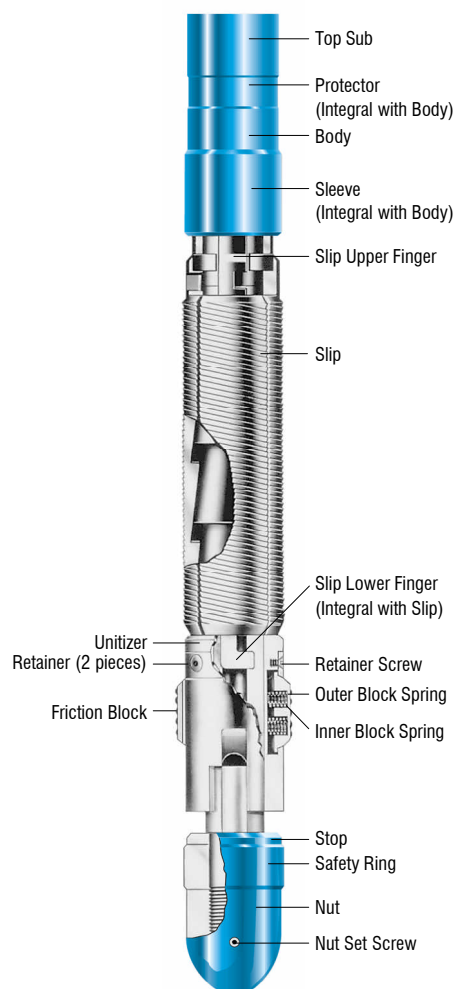
Determine first that the Bowen Full Circle Releasing Spear is the proper size for the fish to be caught, is properly assembled and is in good working condition. Refer to both the Specification Table and to the Range Sheet. Note especially the Slip size and the Safety Ring (or Safety Ring Packoff) size.

Connect the Spear to the fishing string. Set the Spear in its retracted position by ascertaining that the Slip Fingers are engaged with the lugs on the Body and with the lugs on the Unitizer. In this position the Full Circle Slips are pressed inward and will not engage the pipe as the Spear is run in.

To Engage and Pull the Fish

Lower the fishing string slowly until the Spear has entered the fish to the desired depth.

Rotate the fishing string at least one-sixth (¹/₆) of a turn to the left and then pull on the fish by elevating the fishing string.



**Bowen Full Circle Releasing Spear
for Casing**

To Release from the Fish

Bump down the full weight of the fishing string, then rotate the fishing string at least one-sixth ($\frac{1}{6}$) of a turn* to the right and elevate the fishing string until it is clear of the fish.

If the spear will not pull from the fish, bump down; then simultaneously rotate to the right and slowly elevate the fishing string until the Spear is clear of the fish. Combined rotation and elevation are important.

***Note:**

In deep or crooked holes, it may be necessary to rotate more than one-sixth ($\frac{1}{6}$) of a turn. Additional rotation will not hinder the operation of the Spear.

(To operate Left-Hand Spears, observe the above instructions except rotate to the right to engage and to the left to release from the fish.)

Operation with Accessories Safety Ring Packoff

In order to circulate through the fish, install the proper Safety Ring Packoff in place of the Safety Ring. (See Range Sheets on pages 12 and 13.)

After the spear has entered and engaged the fish, start the circulation pumps while maintaining a heavy upward pull on the fish. The fluid passing through the Spear backs up against the Packer, causing a positive seal on the inside of the fish. This will add lifting power to the pulling force exerted on the fishing string while at the same time starting a breakdown of the sediment or formation between the fish and the walls of the well bore, freeing the fish.

Mill Type Nut

If the top of the fish is distorted or plugged in any manner that would prevent easy entry into the fish, install a Mill Type Nut in place of the standard

When the top of the fish is reached, rotate slowly to the right and slowly lower the Spear into the fish to the desired depth.

Side Hill Type Nut

If the top of the fish is badly out of line with the well bore or is imbedded in the sidewall, install a Side Hill Type Nut in place of the standard Bullnose Nut.

When the top of the fish is reached, the fishing string must be lowered, elevated, rotated a portion of a turn and lowered again repeatedly until the leading edge of the Side Hill Type Nut encounters the section of the top of the fish that overlaps the well bore and directs the Spear into the fish.

Sub Type Nut

If it is desired to run other tools below the Spear, such as an Internal Cutter, install a Sub Type Nut in place of the standard Bullnose Nut.

Extensions

Drill Pipe and Tubing Size Spears — If the fish has an unengageable upper end, install as many Extensions between the Top Sub and the Body of the Spear as are required to penetrate the fish to the necessary depth. Standard Extensions are 36" long and are bored for fluid circulation.

Skirts and Guides

Drill Pipe and Tubing Size Spears — If the hole size is so much greater than the fish size that it is possible for the Spear to pass alongside the fish, install proper size Skirt on the Top Sub in place of the Cap and, if necessary, install the proper Oversize Guide on the bottom of the Skirt.

Stop Subs

Stop Subs may be installed anywhere above the Spear for the purpose of limiting the extent of penetration of the Spear into the fish. Stop Subs are also useful in locating the top of the fish and in bumping down against the fish.

Precautions

In deep or crooked holes, it is necessary to rotate the fishing string more than one-sixth ($\frac{1}{6}$) of a turn in order to set or to release the Spear. Additional rotation does not hurt the operation of the Spear.

When right- or left-handing the fish, always maintain a heavy upward strain on the fishing string.

Always bump down the full weight of the fishing string before starting releasing operations.

Explanation of Mechanism Function of the Spear During Engaging Operations

After the Spear has reached the top of the fish, slow lowering of fishing string results in the following:

1. The Nut will direct the Spear into the fish.
2. The proper Safety Ring or Safety Ring Packoff will prevent the Spear from entering any fish whose inside diameter is smaller than the outside diameter of the Slips in their retracted position.
3. The Friction Springs or Friction Blocks, will contact the inner wall of the fish and hold the Unitizer, Friction Retainer, and Slips stationary until the shoulders at the ends of the tapers on the downwardly traveling Body contact the shoulders at the ends of the tapers of the Slips and push the assembly into the fish to the desired depth.

4. The Slips are now in their uppermost position relative to the Body. Thereafter, when the fishing string is rotated to the left, the Slips are held stationary by the Friction Springs or Friction Blocks until the lugs on the upper end of the Body are disengaged from the slots in the upper fingers of the Slips. At the same time, the keys on Stop are simultaneously disengaged from the recesses in the Unitizer.

5. Thereafter, when the fishing string is elevated, the Slips are held stationary by the Friction Springs or Friction Blocks and the tapers on the upwardly raveling Body expand the Slips into tight full circle engagement with the fish.

Function of the Spear During Releasing Operations

1. When the fishing string is bumped down, the Slips are held stationary by the Friction Springs or Friction Blocks and the Body travels downwardly until the lugs on the upper end of the Body are opposite the slots in the upper fingers of the Slips and the recesses in the Unitizer are opposite the tops of the keys on the Stop.
2. Thereafter, when the fishing string is rotated to the right, the Slips are held stationary by the Friction springs or Friction Blocks until the lugs on the Body locate themselves within the Slots in the upper fingers of the Slips. At the same time, the keys on the Stop will locate themselves within the recesses of the Unitizer.
3. The spear can now be pulled up or down the fish because when in this position the Slips cannot be expanded into the fish by the tapers on the Body.

4. As a secondary releasing mechanism, left-hand wickers are cut on the Full Circle Slips and the lugs on the Body and the keys on the Stop will force the Slips to rotate with the Spear. After bumping down to break the hold, combined right-hand rotation and slow elevation of the fishing string unscrews the Spear from the fish.

Explanation of Safety Rings and Safety Ring Packoffs

The outside diameter of the proper Safety Ring or Safety Ring Packoff is slightly larger than the outside diameter of the Slips in their retracted state. Hence, either will prevent the Spear from entering any fish whose inside diameter is smaller than the outside diameter of the Slips in their retracted state. This insures the Spear's ability to release from any fish that it has penetrated. Safety Rings and Safety Ring Packoffs should, therefore, be selected carefully in accordance with the range sheet on pages 12 and 13 in order to obtain this important safety feature.

The packing elements in Safety Ring Packoffs are molded rubber rings bonded permanently in the steel bodies. The design of the rubber ring is such that circulation pressure will expand its lip into a leak-proof fit against the inner walls of the fish.

Maintenance

To guard against misruns and to prolong the life of the tool, the Spear should be thoroughly serviced after use.

1. Disassemble the Spear
 - a. Unscrew the Retainer Screws and slide the Friction Retainer down the Unitizer.
 - b. Lift the Slips off the Body.
 - c. Release the Set Screws in the Nut and unscrew the Nut from the Body.
 - d. Slide off the Safety Ring (or Safety Ring Packoff), the Stop and the Unitizer.
2. Cleanse and carefully check all the parts.
 - a. Replace worn or damaged parts.
 - b. A damaged sleeve must be machined off the Body and a new one welded on.
 - c. A rubber portion of the Safety Ring Packoff can be replaced at the factory.
 - d. The Slip Fingers, when needing replacement, may be installed by any field welding shop - using the Body and the Unitizer to insure proper location of the fingers.
3. Oil or grease all parts.
4. Reassemble in reverse order. Before sliding the Friction Retainer on the Unitizer, make sure that the lower fingers of the Slips are engaged in the Unitizer.
5. To prevent rust, either grease or paint the exterior of the tool except the rubber portion of the Safety Ring Packoff.

Accessories

Safety Ring Packoff

The Safety Ring Packoff is installed in place of the Safety Ring to packoff the fish. Packing elements are molded rubber rings bonded permanently in the steel bodies. The design of the rubber ring is such that circulation pressure will expand its lip into a leak proof fit against the inner walls of the fish.



Safety Ring Packoff

Mill Type Nut

The Mill Type Nut is used in place of the standard bullnose nut to mill away the distorted end of a fish to insure entrance of the Spear into the fish. It is also effective for drilling out a sand-plugged fish.

Sidehill Type Nut

The Side Hill Type Nut is used in place of the standard bullnose nut to align the Spear with a fish that is imbedded in the sidewall of a hole.

Sub Type Nut

The Sub Type Nut is used in place of the standard bullnose nut to provide the connection required to utilize other tools below the Spear such as Internal Cutters.



Mill Type Nut



Side Hill Type Nut



Sub Type Nut

Extensions

An Extension may be installed between the Top Sub and the Body (on Drill Pipe and Tubing size Spears only) so that the Spear may be adapted to penetrate into a fish to the desired depth.

Skirts and Guides

When the hole size is so much greater than the fish size that it is possible for the Spear to pass alongside of the fish, install a Skirt on the Top Sub in place of the Cap (on Drill Pipe and Tubing size

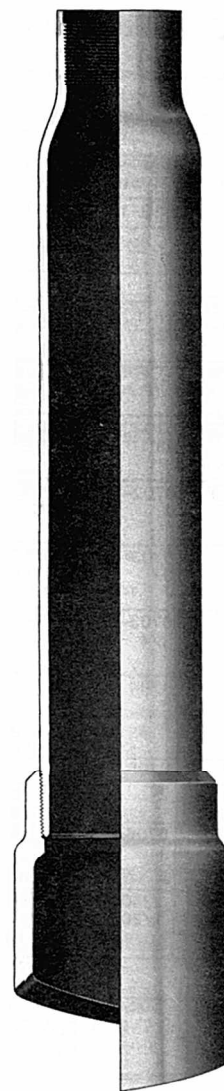
Spears only); then install a Guide on the bottom of the Skirt. Oversize Guides are available for all hole sizes. See page 11.

Stop Subs

Stop Subs are useful in Spear operations to locate the top of the fish, to control the penetration into the fish, and to bump against the fish. Stop Subs may be installed anywhere above the Spear without affecting the operating mechanism.



Extension



Skirt and Guide

Specifications for Drill Pipe and Tubing Spears

Nominal Size	2-3/8	2-3/8	2-7/8	2-7/8	3-1/2	3-1/2	4	4	4-1/2	5-1/2	
	D.P.	Tbg.	D.P.	Tbg.	D.P.	Tbg.	D.P.	Tbg.	D.P.	D.P.	
Recommended Catching Range	2-3/8	2-3/8	2-7/8	2-7/8	3-1/2	3-1/2	4	4	4-1/2	5-1/2 &	
	D.P.	Tbg.	D.P.	Tbg.	D.P.	Tbg.	D.P.	Tbg.	D.P.	5-9/16	
	All Wts.	All Wts.	All Wts.	All Wts.	All Wts.	All Wts.	All Wts.	All Wts.	or Tbg.	D.P.	
O.D. Smallest Slips Retracted	1-11/16	1-29/32	2	2-5/16	2-7/16	2-13/16	3-3/32	3-5/16	3-15/32	4-1/2	
Expansion Slips Over Safety Ring	11/32	11/32	3/8	3/8	13/32	13/32	15-32	15/32	1/2	9/16	
Slip Engagement Area – Sq. In.	55	59	74	87	95	115	126	135	178	265	
Complete Assembly	Part No.	6175	6693	6246	6684	7640	6701	7648	6710	6715	6723
	Weight	32	40	55	60	71	92	107	127	180	270

Replacement Parts for Drill Pipe and Tubing Spears

Top Sub (including Protector)	Part No.	6176	5858	6247	5774	6263	6702	6676	5839	6270	6277				
	Weight	20	20	27	19	28	28	50	35	52	80				
Protector	Part No.	6176-1	5858-1	6247-1	5774-1	6263-1	6702-1	6676-1	5839-1	6270-1	6277-1				
	Weight	1	1	4	1	2-1/2	2	3-1/2	2	3-1/2	5-1/2				
Body	Part No.	6177	6694	6248	6685	7641	6703	7649	6711	6716	6724				
	Weight	12	15	19	21	27	31	36	43	60	100				
Sleeve (Integral w/Body)	Part No.	6177-1	6694-1	6248-1	6685-1	7641-1	6703-1	7649-1	6711-1	6716-1	6724-1				
	Weight	1/4	1/4	1/3	1/2	5/8	3/4	7/8	1	1-3/4	3				
Slip (including Fingers)	Part No.	6178	6695	6249	6686	7642	6704	7650	6712	6717	6725				
	No. Req'd.	3	3	3	3	3	3	3	3	3	4				
	Weight	1	1-1/4	1-3/8	1-1/2	2-1/2	5	6	7	9	12				
Unitizer	Part No.	6179	6696	6250	6687	7643	6705	SEE OPTIONAL ACCESSORIES ON PAGE 7							
	Weight	1	1-1/4	1-3/4	2	3	4								
Friction Retainer (including Springs)	Part No.	6546-F	6697-F	6542-F	6688-F	7644-F	6706-F								
	Weight	1/2	1/2	5/8	5/8	1	1								
Friction Retainer Screws (4 Req'd.)	Part No.	6423	6623	6423	6423	6423	23508	2-3/8" DRILL PIPE to 3-1/2" TUBING SPEARS DO NOT USE FRICTION BLOCK ASSEMBLY							
	Weight	1/100	1/100	1/100	1/100	1/100	1/50								
Friction Block Assembly (Includes the Following)	Part No.											14391	14901	14937	14838
	Weight											9	9	10	10
Unitizer	Part No.											14932	14902	14938	14839
	Weight											6	6	7	7
Retainer (2 Pieces)	Part No.											14933	14903	14939	14841
	Weight											1	1	1-1/2	1-1/2
Friction Block	Part No.											14934	14904	14940	14840
	No. Req'd.											2	2	2	4
	Weight							1/2	1/2	1/2	1/2				
Retainer Screw	Part No.	15964	23108	15964	25214										
	No. Req'd.	4	4	4	4										
	Weight	1/8	1/8	1/8	1/8										
Outer Block Spring	Part No.	14935	14919	14919	14842										
	No. Req'd.	4	4	4	8										
	Weight	3/8	3/8	3/8	3/8										
Inner Block Spring	Part No.	14936	14920	14920	14837										
	No. Req'd.	4	4	4	8										
	Weight	1/4	1/4	1/4	1/4										

Specifications for Drill Pipe and Tubing Spears

Nominal Size		2-3/8	2-3/8	2-7/8	2-7/8	3-1/2	3-1/2	4	4	4-1/2	5-1/2
		DP	Tbg	DP	Tbg	DP	Tbg	DP	Tbg	DP	DP
Complete Assembly	Part No.	6175	6693	6246	6684	7640	6701	7648	6710	6715	6723

Replacement Parts for Drill Pipe and Tubing Spears

Stop	Part No.	7638	6961	7639	7452	7645	7647	7653	7654	7655	7454
	Weight	1/3	1/2	5/8	3/4	1	1-1/2	2	2-1/2	3	4
Safety Ring	Part No.	6547	6545	6543	6424	6541	6707	6681	6539	6720	6485
	Weight	3/4	4/5	1-1/2	1-3/4	2	2-1/2	3	3-1/2	4-1/2	7
Nut	Part No.	6180	5864	6251	6345	6267	6708	6682	5729	6721	6483
	Weight	2	2-1/2	3	4	4-1/2	5-1/2	7	9	12	28
Nut Screw (2 Req'd.)	Part No.	23330	23330	17762	17762	17762	23358	23345	23366	23368	23379

How to Order

Specify:

- (1) Name and number of assembly or part
- (2) Size and type of top connection
- (3) Size and weight of pipe to be caught

RECOMMENDED SPARES:

- (1) 2 Sets Slips for each size to be caught
- (2) 1 Unitizer (or 2 Friction Block Assemblies)
- (3) 2 Friction Retainers (or 2 Friction Block Assemblies)
- (4) 1 Stop
- (5) 1 Safety Ring for each size of Slips

Accessories for Drill Pipe and Tubing Spears

Safety Ring Packoff	Part No.	6181	6174	6252	5779	6268	6709	6683	5730	6722	6484
	Weight	5/8	3/4	1	1-1/4	1-1/2	1-3/4	2-1/2	2-3/4	3-1/2	6
Extension (3 feet long)	Part No.	6176-	5858-	6247-	5774-	6263-	6702-	6676-	5839-	6270-	6277-
		6177	6694	6248	6685	6264	6703	7649	6711	6716	6724
	Weight	22	26	29	40	46	60	70	75	85	130
Mill Type Nut	Part No.	6180-A	5864-A	6251-A	6345-A	6267-A	6708-A	6682-A	5729-A	6721-A	6483-A
	Weight	1-3/4	2	2-1/2	3-1/4	3-3/4	4-1/2	6	8	11	26
Sub Type Nut	Part No.	6180-B	5864-B	6251-B	6345-B	6267-B	6708-B	6682-B	5729-B	6721-B	6483-B
	Weight	2-1/2	3	3-1/2	4-3/4	5-1/2	6-1/2	9	11	14-1/2	31
Side Hill Type Nut	Part No.	6180-C	5864-C	6251-C	6345-C	6267-C	6708-C	6682-C	5729-C	6721-C	6483-C
	Weight	2	2-1/2	3	4	4-3/4	5-1/2	8	9-1/2	13	29

How to Order

Specify:

- (1) Size and type of required connection
- (2) Weight or weights of pipe to be retrieved

RECOMMENDED SPARES:

- (1) 3 Safety Ring for each size of slips

Optional Accessories

Unitizer	Part No.	—	—	—	—	—	—	7651	6713	6718	6726
	Weight	—	—	—	—	—	—	5-1/2	7	8-1/2	11
Friction Retainer	Part No.	—	—	—	—	—	—	7652-F	6714-F	6719-F	6727-F
	Weight	—	—	—	—	—	—	2	2-1/2	3	4-1/2
Friction Retainer Screws	Part No.	—	—	—	—	—	—	7646	7646	7646	6373-1
(4 Req'd.) (incl. Springs)	Weight	—	—	—	—	—	—	1/50	1/50	1/50	1/50

RECOMMENDED SPARES:

- (1) Unitizer
- (2) Friction Retainer

Specifications for Casing Spears

Nominal Size	4-1/2	5	5-1/2	6	6-5/8	7	7-5/8	8-5/8	9-5/8	10-3/4	11-3/4	13-3/8
Recommended Catching Range (for all weights)	4-1/2 4-3/4, 5	5	5-1/2	6	6-5/8	7	7-5/8	8-5/8, 9	9-5/8, 10	10-3/4	11-3/4, 12	13, 13-3/8
Expansion Slips Over Safety Ring	1/2	1/2	9/16	9/16	5/8	5/8	5/8	11/16	3/4	13/16	13/16	13/16
O.D. Smallest Slips Retracted	3-25/32	4	4-1/2	5-1/6	5-1/2	5-3/4	6-7/16	7-1/4	8-3/16	9-1/2	10-9/16	12
Slip Engagement Area – Sq In	210	217	265	315	350	365	430	485	580	690	785	890
Complete Assembly	Part No.	10536	9337	9342	9347	9796	9352	10608	6318	10473	6067	6073
	Weight	132	169	226	283	358	398	502	652	833	1240	1552
												2017

Replacement Parts

Body	Part No.	10537	9338	9343	9348	9797	9353	10609	6319	10474	6068	6074	6082
	Weight	71	86	110	146	189	205	258	323	432	670	840	1100
Sleeve	Part No.	10537-1	9338-1	9343-1	9348-1	9797-1	9353-1	10609-1	6319-1	10474-1	6068-1	6074-1	6082-1
Integral with Body	Weight	2-1/4	2-1/2	3	4	5	6	8	12	15	20	25	32
Slip (including Fingers)	Part No.	10538	9339	9344	9349	9798	9354	10610	6320	10475	6069	6075	6083
	Weight	10	11	12	14	17	20	24	29	36	44	55	72
	No. Req'd.	3	3	4	4	4	4	4	4	4	6	6	6
Friction Block Assembly (includes the following)	Part No.	14923	14943	14949	14950	14956	14958	14964	14970	14976	14981	14986	14991
	Weight	12	13-1/2	17-1/2	23	31	40-1/2	50	60-1/2	71	86	92-1/2	138
Unitizer	Part No.	14924	14944	14962	14951	14957	14959	14965	14971	14977	14982	14987	14992
	Weight	8	9	11	14	18	23	30	38	48	60	74	89
Retainer (2 Pieces)	Part No.	14925	14945	14841	14952	14834	14960	14966	14972	14978	14983	14988	14993
	Weight	3/4	1	1	1-1/2	2	2-1/2	3	3-1/2	4	5	5-1/2	6
Friction Block	Part No.	14927	14946	14840	14953	14835	14961	14967	14973	14979	14984	14989	14994
	Weight	1-1/4	1	1	1-1/2	2	2-1/2	3	3-1/2	4	4-1/2	5	6
	No. Req'd.	2	2	4	4	4	4	4	4	4	4	6	6
Retainer Screw	Part No.	15964	25214	25214	23126	23108	23108	23109	25221	25221	25221	25221	25221
	Weight	1/32	1/32	1/32	1/16	1/16	1/16	1/8	1/8	1/8	1/8	1/8	1/8
	No. Req'd.	2	4	4	4	8	4	4	4	4	4	6	6
Outer Block Spring	Part No.	14926	14919	14842	14842	14836	14836	14836	14836	17694	17694	14990	14996
	Weight	1/4	1/4	1/4	1/4	3/8	3/8	3/8	3/8	1/2	1/2	1/2	3/8
	No. Req'd.	2	6	4	4	8	8	8	8	12	12	18	18
Block Spring Inner	Part No.	16589	14920	14837	14837	14837	14837	14837	14837	11816	11816	11816	11816
	Weight	1/8	1/8	1/8	1/8	1/4	1/4	1/4	1/4	3/8	3/8	3/8	3/8
	No. Req'd.	2	6	4	4	8	8	8	8	12	12	18	18
Stop	Part No.	A-7603	A-7580	A-7454	7597	B-6965	7609	7626	7494	7531	7627	7628	7629
	Weight	2-1/4	3	4	5	7	9	11	14	18	23	29	36
Safety Ring	Part No.	6733	7581	6485	6520	6488	6522	6524	6528	6531	6533	6535	6537
	Weight	5	6	7	8-1/2	11	12	16	25	32	45	56	73
Nut	Part No.	6376	7582	6483	6040	6108	6046	6054	6321	6062	6071	6079	6087
	Weight	17	21	28	33	42	46	57	86	107	134	168	216
Nut Set Screw	Part No.	23368	23368	23379	23379	23379	23379	23386	23386	23386	41056	41056	41056
	No. Req'd.	2	2	2	2	2	2	2	2	2	2	2	2

How to Order

Specify:

- (1) Name and number of assembly or parts
- (2) Size and type of required connection
- (3) Size and weight of pipe to be retrieved

RECOMMENDED SPARES:

- (1) 2 Sets Slips for Each Size to be Caught
- (2) 2 Friction Block Assemblies
- (3) 1 Stop
- (4) 1 Safety Ring for Each Size of Slips

Specifications (Continued)

Nominal Size		4-1/2	5	5-1/2	6	6-5/8	7	7-5/8	8-5/8	9-5/8	10-3/4	11-3/4	13-3/8
Complete Assembly	Part No.	10536	9337	9342	9347	9796	9352	10608	6318	10473	6067	6073	6081

Accessories

Safety Ring Packoff	Part No.	6734	7583	6484	6041	6487	6047	6055	6529	6063	6072	6080	6088
	Weight	4	5	6	7	9	10	12	17	23	35	44	59
Mill Type Nut	Part No.	6376-A	7582-A	6483-A	6040-A	6108-A	6046-A	6054-A	6321-A	6062-A	6071-A	6079-A	6087-A
	Weight	16	20	26	30	39	43	53	81	102	128	160	205
Sub Type Nut	Part No.	6376-B	7582-B	6483-B	6040-B	6108-B	6046-B	6054-B	6321-B	6062-B	6071-B	6079-B	6087-B
	Weight	19	24	31	36	46	51	63	94	118	148	185	238
Side Hill Type Nut	Part No.	6376-C	7582-C	6483-C	6040-C	6108-C	6046-C	6054-C	6321-C	6062-C	6071-C	6079-C	6087-C
	Weight	18	23	28	33	42	47	58	88	110	138	172	221

Optional Accessories

Unitizer	Part No.	10539	9340	9345	9350	9799	9355	10611	7493	10476	6070	6078	6086
	Weight	8	9	11	14	18	23	30	38	48	60	74	89
Friction Retainer (Incl. Springs)	Part No.	10540	9341	9346	9351	9800	9356	10612	7495-F	10477	6532-F	6534	6536-F
	Weight	3	3-3/4	4-1/2	6	7-1/2	9	12	15	20	24	30	39
Friction Retainer Screws (2 Req'd.)	Part No.	6373-1	6373-1	6373-1	7596	6964	6964	7496	7496	7496	7496	7496	7496
	Weight	1/50	1/50	1/50	1/30	1/20	1/20	1/10	1/10	1/10	1/10	1/10	1/10

How to Order

Specify:

- (1) Name and number of assembly or parts
- (2) Size and type of required connection
- (3) Size and weight of pipe to be retrieved

RECOMMENDED SPARES:

- (1) 2 Sets Slips for Each Size to be Caught
- (2) 2 Friction Block Assemblies
- (3) 1 Stop
- (4) 1 Safety Ring for Each Size of Slips

Skirts for All Types of Spears

Size		2-3/8"	2-7/8"	3-1/2"	4"	4-1/2"	5-1/2"	6-5/8"
4" OD	Part No.	4644	4646	—	—	—	—	—
	Weight	17	17	—	—	—	—	—
4-1/2" OD	Part No.	4645	4647	4649	19446	—	—	—
	Weight	19	19	27	27	—	—	—
5" OD	Part No.	—	4648	4650	19447	—	—	—
	Weight	—	24	30	30	—	—	—
5-1/2" OD	Part No.	—	4778	4651	19448	4652	—	—
	Weight	—	32	34	34	41	—	—
6" OD	Part No.	—	—	19441	19449	19454	—	—
	Weight	—	—	46	46	48	—	—
6-5/8" OD	Part No.	—	—	5495	19450	4653	4655	—
	Weight	—	—	58	58	58	66	—
7" OD	Part No.	—	—	5494	19451	4654	5497	—
	Weight	—	—	64	64	64	64	—
7-5/8" OD	Part No.	—	—	4772	19452	4864	4656	4658
	Weight	—	—	78	78	78	78	78
8-5/8" OD	Part No.	—	—	4773	19453	5496	4657	4659
	Weight	—	—	87	87	87	87	87
9" OD	Part No.	—	—	—	—	—	4792	4660
	Weight	—	—	—	—	—	93	93
9-5/8" OD	Part No.	—	—	—	—	—	—	4661
	Weight	—	—	—	—	—	—	98

How to Order

Specify:

- (1) Number of assembly
- (2) Assembly number and size of taper tap or spear to be used with skirt
- (3) Outside diameter of skirt

Skirt Guides for All Types of Spears

Skirt O.D.		4"	4-1/2"	5"	5-1/2"	6"	6-5/8"	7"	7-5/8"	8-5/8"	9"	9-5/8"
Over 5" to 6" OD	Part No.	4662	4663	4664	—	—	—	—	—	—	—	—
	Weight	27	30	34	—	—	—	—	—	—	—	—
Over 6" to 7" OD	Part No.	4662	4663	4664	4665	—	—	—	—	—	—	—
	Weight	34	38	42	49	—	—	—	—	—	—	—
Over 7" to 8" OD	Part No.	—	4663	4664	4665	4685	—	—	—	—	—	—
	Weight	—	48	53	55	58	—	—	—	—	—	—
Over 8" to 9" OD	Part No.	—	4663	4664	4665	4685	4299	3824	—	—	—	—
	Weight	—	53	58	60	62	64	65	—	—	—	—
Over 9" to 10" OD	Part No.	—	—	—	4665	4685	4299	3824	4666	—	—	—
	Weight	—	—	—	65	67	70	72	74	—	—	—
Over 10" to 11" OD	Part No.	—	—	—	4665	4685	4299	3824	4666	4295	—	—
	Weight	—	—	—	70	76	79	82	82	84	—	—
Over 11" to 12" OD	Part No.	—	—	—	—	—	4299	3824	4666	4295	4667	4668
	Weight	—	—	—	—	—	79	82	84	87	89	91
Over 12" to 13" OD	Part No.	—	—	—	—	—	—	3824	4666	4295	4667	4668
	Weight	—	—	—	—	—	—	87	89	91	93	95

Range Sheet for Drill Pipe and Tubing

FOR FISH SIZE		USE SPEAR		USE SLIP		USE FRICTION BLOCK		USE SAFETY RING OR SAFETY RING PACKOFF		
Drill Pipe or Tubing Size	Weight (in lbs)	Nominal Casing Size	Part No.	Size (Stamped)	Part No.	Part No.	Size (Stamped)	Size (Stamped)	SR Part No.	SRPO Part No.
2-3/8 DP	6.65	2-3/8 DP	6175	1-13/16	6178	—	—	1-11/16	6547	6181
2-3/8 DP	4.80	2-3/8 DP	6175	2	6178	—	—	1-7/8	6547	6181
2-3/8 Tubing	4.7, 4.6, and 4.0	2-3/8 Tubing	6693	2-1/32	6695	—	—	1-29/32	6545	6174
2-7/8 DP	10.40	2-7/8 DP	6246	2-5/32	C6249	—	—	2	6543	6252
2-7/8 DP	8.35	2-7/8 DP	6246	2-11/32	C6249	—	—	2-3/16	6543	6252
2-7/8 DP	6.45	2-7/8 DP	6246	2-1/2	C6249	—	—	2-11/32	6543	6252
2-7/8 Tubing	8.7	2-7/8 Tubing	6246	2-1/4	C6249	—	—	2-1/8	6543	6252
2-7/8 Tubing	8.7	2-7/8 Tubing	6684	2-1/4	6686	—	—	2-1/8	6424	5779
2-7/8 Tubing	6.50 and 6.40	2-7/8 Tubing	6684	2-7/16	6686	—	—	2-5/16	6424	5779
3-1/2 DP	15.5	3-1/2 DP	7640	2-5/8	7642	—	—	2-7/16	6541	6268
3-1/2 DP	13.3	3-1/2 DP	7640	2-25/32	7642	—	—	2-19/32	6541	6268
3-1/2 DP	11.2	3-1/2 DP	7640	2-15/16	7642	—	—	2-3/4	6541	6268
3-1/2 DP	8.5	3-1/2 DP	7640	3-3/32	7642	—	—	2-29/32	6541	6268
3-1/2 Tubing	10.2, 9.3, and 9.2	3-1/2 Tubing	6701	2-31/32	6704	—	—	2-13/16	6707	6709
3-1/2 Tubing	7.70	3-1/2 Tubing	6701	3-1/8	6704	—	—	2-15/16	6707	6709
4 DP	15.7	4 DP	7648	3-9/32	7650	14934	—	3-3/32	6681	6683
4 DP	14.00	4 DP	7648	3-11/32	7650	—	—	3-5/32	6681	6683
4 Tubing	11.0	4 Tubing	6710	3-1/2	6712	14904	3-1/4	3-5/16	6539	5730
4 Tubing	9.5	4 Tubing	6710	3-19/32	6712	—	—	3-13/32	6539	5730
4-1/2 DP	20	4-1/2 DP	6715	3-11/16	6717	14940	3-5/8	3-15/32	6720	6722
4-1/2 DP	18.1 and 16.6	4-1/2 DP	6715	3-7/8	6717	—	—	3-21/32	6720	6722
4-1/2 DP	13.75 and 12.75	4-1/2 DP	6715	4-1/32	6717	—	—	3-13/16	6720	6722
5-1/2 DP	24.7 and 21.9	5-1/2 DP	6723	4-3/4	6725	14840	4-3/4	4-1/2	6485	6484
5-9/16 DP	25.25	5-1/2 DP	6723	4-3/4	6725	14840	4-3/4	4-1/2	6485	6484
5-9/16 DP	22.2	5-1/2 DP	6723	4-7/8	6725	—	—	4-5/8	6485	6484
5-9/16 DP	19.0	5-1/2 DP	6723	5-1/16	6725	—	—	4-13/16	6485	6484

NOTE:

The spears for drill pipe listed above will pass through API, Reed, Spang, Hughes, and Hydril I.F. tool joints and through internal upset section on Spang double-seal external upset drill pipe.

NOTES: Caution

- 1) 6684 dressed for 2-7/8" 8.7 lb. will not go in completely. The Top Sub is 2-5/16" and will not go into tubing.
- 2) 6246 dressed for 2-7/8" 8.7 lb. will not go in completely. The Top Sub is 3-5/8" O.D. and will not go in completely.

Range Sheet for Casing

FOR FISH SIZE		USE SPEAR		USE SLIP		USE FRICTION BLOCK		USE SAFETY RING OR SAFETY RING PACKOFF		
Casing Size	Weight (in lbs)	Nominal Casing Size	Part No.	Size (Stamped)	Part No.	Part No.	Size (Stamped)	Size (Stamped)	SR Part No.	SRPO Part No.
4-1/2	13.5 and 11.6	4-1/2	10536	4	10538	14927	4-1/2	3-25/32	6733	6734
4-1/2	9.5	4-1/2	10536	4-5/32	10538	—	—	3-15/16	6733	6734
4-3/4	16.0	4-1/2	10536	4-5/32	10538	14927	4-1/2	3-15/16	6733	6734
5	21.0	5	9337	4-7/32	9339	14946	4-5/8	4	7581	7583
5	18.0 lb and 17.7	5	9337	4-11/32	9339	—	—	4-1/8	7581	7583
5*	15.0.	5	9337	4-15/32	9339	—	—	4-1/4	7581	7583
5	13.0 and 11.5	5	9337	4-19/32	9339	—	—	4-3/8	7581	7583
5-1/2	23.0	5-1/2	9342	4-3/4	9344	14840	4-3/4	4-1/2	6485	6484
5-1/2.	20.0 and 17.0	5-1/2	9342	4-7/8	9344	—	—	4-5/8	6485	6484
5-1/2	15.5, 14.0, and 13.0	5-1/2	9342	5-1/16	9344	—	—	4-13/16	6485	6484
5-3/4 †	22.5 and 19.5	5-1/2	9342	5-1/16	9344	14840	5-1/16	4-13/16	6485	6484
5-3/4 †	17.0 and 14.0	5-1/2	9342	5-5/16	9344	—	—	5-1/16	6485	6484
6	23.0	6	9347	5-5/16	9349	14953	4-3/4	5-1/16	6520	6041
6	20.0 and 18.0	6	9347	5-7/16	9349	—	—	5-3/16	6520	6041
6	16.0 and 15.0	6	9347	5-19/32	9349	—	—	5-11/32	6520	6041
6-5/8	32.0, 29.0, and 28.0	6-5/8	9796	5-3/4	9798	14835	5-3/4	5-1/2	6488	6487
6-5/8	26.8, 26.0, 24.0, and 22.0	6-5/8	9796	5-15/16	9798	—	—	5-11/16	6488	6487
6-5/8	20.0 and 17.0	6-5/8	9796	6-1/8	9798	14835	6-1/8	5-7/8	6488	6487
7	40.0	6-5/8	9796	5-15/16	9798	14835	6-1/8	5-11/16	6488	6487
7	38.0 and 35.0	7	9352	6	9354	14961	5-3/4	5-3/4	6522	6047
7	32.0, 30.0, 29.0, and 28.0	7	9352	6-3/16	9354	—	—	5-15/16	6522	6047
7	26.0, 24.0, 23.0, and 22.0	7	9352	6-3/8	9354	—	—	6-1/8	6522	6047
7	20.0 and 17.0	7	9352	6-17/32	9354	—	—	6-9/32	6522	6047
7-5/8	39.0 and 33.7	7-5/8	10608	6-11/16	10610	14967	6-5/8	6-7/16	6524	6055
7-5/8	29.7 and 26.4	7-5/8	10608	6-15/16	10610	—	—	6-11/16	6524	6055
7-5/8	24.0 and 20.0	7-5/8	10608	7-3/32	10610	—	—	6-27/32	6524	6055
8	26.0	7-5/8	10608	7-7/16	10610	14967	6-7/8	7-3/16	6524	6055
8-1/8	39.5 and 35.5	7-5/8	10608	7-1/4	10610	14967	6-7/8	7	6524	6055
8-1/8	32.0 and 28.0	7-5/8	10608	7-7/16	10610	—	—	7-3/16	6524	6055
8-5/8	49.0 and 44.0	8-5/8	6318	7-9/16	6320	14973	7-3/4	7-1/4	6528	6529
8-5/8	43.0, 40.0, 38.0, and 36.0	8-5/8	6318	7-13/16	6320	—	—	7-1/2	6528	6529
8-5/8*	32.0, 28.0 and 24	8-5/8	6318	8-1/16	6320	—	—	7-3/4	6528	6529
9	55	8-5/8	6318	7-13/16	6320	14973	7-3/4	7-1/2	6528	6529
9	45	8-5/8	6318	8-1/16	6320	—	—	7-3/4	6528	6529
9	40.0, 38.0, and 34.0	8-5/8	6318	8-5/16	6320	—	—	8	6528	6529
9-5/8	58.0, 53.5, and 47.0	9-5/8	10473	8-1/2	10475	14979	8-7/8	8-3/16	6531	6063
9-5/8	43.5, 40.0, and 36.0	9-5/8	10473	8-13/16	10475	—	—	8-1/2	6531	6063
9-5/8	32.3 and 29.3	9-5/8	10473	9	10475	—	—	8-11/16	6531	6063
10	33.0	9-5/8	10473	9-3/8	10475	14979	8-7/8	9-1/16	6531	6063
10-3/4	55.5, 54.0, 51.0, and 48.0	10-3/4	6067	9-13/16	6069	14984	10	9-1/2	6533	6072
10-3/4	45.5, 45.0, 40.5, 40.0, and 32.75	10-3/4	6067	10-1/16	6069	—	—	9-3/4	6533	6072
11-3/4	60.0 and 54.0	11-3/4	6073	10-7/8	6075	14989	—	10-9/16	6535	6080
11-3/4	47.0, 42.0, and 38.0	11-3/4	6073	11-1/8	6075	—	—	10-13/16	6535	6080
12	40.0	11-3/4	6073	11-3/8	6075	14989	—	11-1/16	6535	6080
13	54.0, 50.0, 45.0, and 40	13-3/8	6081	12-3/8	6083	14994	12-1/4	12	6537	6088
13-3/8	83.0, 72.0, 68.0, and 61.0	13-3/8	6081	12-3/8	6083	14994	12-1/4	12	6537	6088
13-3/8	54.4 and 48.0	13-3/8	6081	12-5/8	6083	—	—	12-1/4	6537	6088
16	84.0, 75.0, 65.0, and 55.0	13-3/8	6081	15-3/16	6083	14994	15	14-13/16	6537	6088

NOTES:

* If spear must pass through joint on 5"-15.0 lb Spang Extreme Line Casing or through joint on 8-5/8" - 32 lb Spang Extreme Line Casing, use next smaller size Slip and Safety Ring, or Safety Ring Packoff.

† Requires Oversize Friction Retainer, Part No. 9346-FO.

Full Circle Releasing Spear Strength Chart

Complete Assembly No.	Slip No.	Yield Strength of Body – lbs	Complete Assembly No.	Slip No.	Yield Strength of Body – lbs
6067	6069	3,300,000	6723	6725	628,000
6073	6075	4,300,000	7640	7642	172,000
6081	6083	5,961,000	7648	7650	296,000
6175	6178	56,400	9337	9339	454,000
6246	6249	110,400	9342	9344	628,000
6318	6320	1,761,000	9347	9349	945,000
6684	6686	134,000	9352	9354	1,228,000
6693	6695	71,500	9796	9798	1,060,000
6701	6704	224,000	10473	10475	2,324,000
6710	6712	275,000	10536	10538	376,000
6715	6717	318,000	10608	10610	1,414,000

NOTE:

All listed strengths are theoretical calculations based upon the yield strength of the material and are accurate within 20%. They refer to the tensile strength of the body and do not relate to the strength of the fish being engaged. Thin walled or old corroded pipe may allow the grapple to expand to the point where it can jump the mandrel spirals. Jarring may amplify the pull load by a factor of 3 to 10.

Corporate Headquarters

10000 Richmond Avenue
Houston, Texas 77042
United States
Phone: 713 346 7500
Fax: 713 346 7959

Alaska

4111 Ingra
Anchorage, Alaska 99503
United States
Phone: 907 563 5253
Fax: 907 561 0071

California

4117 Atlas Court
Bakersfield, California 99308
United States
Phone: 661 395 0165
Fax: 661 328 1827

Louisiana

108 Nova Drive
Broussard, Louisiana 70518
United States
Phone: 337 839 2400
Fax: 337 839 2211

190 Thompson Road
Houma, Louisiana 70363
United States
Phone: 985 851 1111
Fax: 985 851 1117

Mississippi

2930 Industrial Blvd.
Laurel, Mississippi 39440
United States
Phone: 601 649 8671
Fax: 601 649 8673

New Mexico

#14 CR 5860
Farmington, New Mexico 87401
United States
Phone: 505 326 4303
Fax: 505 326 4304

North Dakota

3202 1st Avenue West
Williston, North Dakota 58801
United States
Phone: 701 774 0091
Fax: 701 774 0092

Oklahoma

3800 Thomas Road
Oklahoma City, Oklahoma 73179
United States
Phone: 405 677 2484
Toll Free: 877 760 1711
Fax: 405 677 2457

Texas

1249 Commerce Road
Alice, Texas 78332
United States
Phone: 361 664 8013
Fax: 361 664 0462

8411 Irvington Boulevard*
Houston, Texas 77022
United States
Phone: 713 691 7800
Fax: 713 691 7807

2810 Highway 135 North
Kilgore, Texas 75662
United States
Phone: 903 984 2553
Fax: 903 984 7170

10720 West I-20 East
Odessa, Texas 79765
United States
Phone: 432 563 1173
Fax: 432 563 1182

30444 Southwest Freeway
Rosenberg, Texas 77471
United States
Phone: 281 341 5365
Fax: 281 344 1986

Utah

1553 East Highway 40
Vernal, Utah 84078
United States
Phone: 435 789 0670
Fax: 435 789 6568

West Virginia

Route 2, Murphy Run Road
Clarksburg, West Virginia 26301
United States
Phone: 304 622 4303
Fax: 304 623 2174

Wyoming

1283 N. Derrick Drive
Unit 1, Box 2
Casper, Wyoming 82604
United States
Phone: 307 237 3100
Fax: 307 237 2546

Canada

9120 - 34A Avenue
Edmonton, Alberta T6E 5P4
Canada
Phone: 780 702 5209
Fax: 780 463 2348

3550 93 Street*
Edmonton, Alberta T6E 5N3
Canada
Phone: 780 944 3929
Fax: 780 430 0760

1100 540 5th Avenue SW (Mailing)
1010 540 5th Avenue SW (Office)
Calgary, Alberta T2P 0M2
Canada
Phone: 403 250 8000
Fax: 403 294 5790

England

2 Isbourne Way
Winchcombe
Cheltenham
Glos, GL54 5NS
England
Phone: 44 (0) 1242 603975
Fax: 44(0) 1242 602614

Dubai

Nr. R/A 13, Daimler Chrysler Street
P.O. Box 61490
Jebel Ali Free Zone
Dubai
UAE
Phone: 971 4 8838776
Fax: 971 4 8838795

Indonesia

Cilandak Commercial Estate Unit 105
Jl. Raya Cilandak KKO
P.O. Box 7541
Jakarta, 12560
Indonesia
Phone: 62 21 782 6088
Fax: 62 21 782 6086

Scotland

10 Kirkton Avenue
Pitmedden Road Industrial Estate
Dyce, Aberdeen AB21 0BF
Scotland
Phone: 441 224 334800
Fax: 441 224 723034

Singapore

9 Tuas Avenue 5
Singapore, 639335
Singapore
Phone: 65 68611566
Fax: 65 68610728

Germany

Edesser Straße 1
31234 Edemissen Berkhöpen
Postfach 31232
Germany
Phone: 49 5176 97670
Fax: 49 5176 9767 22

* Denotes Manufacturing and Engineering facilities

Downhole Solutions

Drilling Solutions

Engineering and Project Management Solutions

Lifting and Handling Solutions

Production Solutions

Supply Chain Solutions

Tubular and Corrosion Control Solutions

Well Service and Completion Solutions